IV RESULTS & DISCUSSION

From the investigation of the mode shapes during the loading process, it appeare that the high values of λ^* the rapid increase in the unsymmetric second mode just before buckling was quite evident. All of the specimens were tested for geometries ranging from 17.512 to 52.009, and the whole experiments were completely elastic as the specimens were found to return to their original shape within a few thousandths of an inch on unloading, therefore the specimens remained in straight line when the load was removed.

All of theoretical values were calculated by considering the initial axial thrust H_o of bowed strut to be equal to the first law of Euler as discussed by Niles, and Newell (9), i.e. $H_o = \pi^2 EI/L^2$ or $S = 1$.

The non-dimensional experimental results of both hinged and clamped ends are listed in table 3 and figure 13 & figure 14, and the theoretical values of both criteria are compared with the experimental results in table 4 and figure 15 & figure 16.

It is seen that the experimental results agree quite well with results based on the energy buckling criterion for higher values of rise "b" of bowed struts.

Table 2.1

Result of A Bowed Strut Under A Lateral Central Concentrated Load

Spec. No. : 1 Size : 48 x 1.973 x 0.232 inches

Condition of ends : Hinged Rise of curvature : 0.500 inches

Central angle : 0.08380 rads. Radius of curvature : 576.250 inches

No.	Central deflection B_1 in inches	b^*_1	Lateral dead weight P in Pounds	P^*
1	0	0	0	0
2	0.008	0.00197	8.5	0.01835
3	0.023	0.00568	16.5	0.03561
4	0.047	0.01161	24.5	0.05288
5	0.062	0.01532	30.5	0.06583
6	0.086	0.02125	36.0	0.07770
7	0.109	0.02693	40.0	0.08634
8	0.125	0.03088	42.0	0.09065
9	0.148	0.03657	43.0	0.09281
10			44.0++	0.09497

Notes: $b^*_1 = \frac{B_1}{R\beta}2$; $P^* = \frac{PR}{Et^2 f\beta}$

++ - The snap buckling occurs.

Table 2.2

Result of A Bowed Strut Under A Lateral Central Concentrated Load

Spec. No. : 2 Size : 48 x 1.973 x 0.231 inches

Condition of ends : Hinged Rise of curvature : 0.625 inches

Central angle : 0.10476 rads. Radius of curvature : 461.113 inches

No.	Central deflection B_1 in inches	b^*_1	Lateral dead weight P in Pounds	P^*
1	0	0	0	0
2	0.016	0.00316	20.0	0.02763
3	0.024	0.00474	30.0	0.04145
4	0.040	0.00790	40.0	0.05526
5	0.047	0.00928	45.0	0.06217
6	0.063	0.01244	50.0	0.06908
7	0.079	0.01561	55.0	0.07599
8	0.102	0.02015	59.0	0.08151
9	0.110	0.02173	60.0	0.08290
10	0.117	0.02312	61.0	0.08428
11			61.5++	0.08497

Notes: $b^*_1 = \frac{B_1}{R\beta}2$; $P^* = \frac{PR}{Et^2 f\beta}$

++ - The snap buckling occurs.

Table 2.3

Result of A Bowed Strut Under A Lateral Central Concentrated Load

Spec. No. : 3 Size : 48 x 1.973 x 0.233 inches

Condition of ends : Hinged Rise of curvature : 0.750 inches

Central angle : 0.12571 rads. Radius of curvature : 384.375 inches

No.	Central deflection B_1 in inches	b_1^*	Lateral dead weight P in Pounds	P^*
1	0	0	0	0
2	0.015	0.00246	14.0	0.01344
3	0.023	0.00378	22.0	0.02111
4	0.031	0.00510	30.0	0.02879
5	0.042	0.00691	38.0	0.03647
6	0.055	0.00905	46.0	0.04415
7	0.086	0.01415	62.0	0.05950
8	0.101	0.01662	68.0	0.06526
9	0.109	0.01794	71.0	0.06814
10	0.125	0.02057	73.0	0.07006
11			74.0++	0.07102

Notes: $b_1^* = \frac{B_1}{R\beta}2$; $P^* = \frac{PR}{Et^2 f \beta}$

++ - The snap buckling occurs.

Table 2.4

Result of A Bowed Strut Under A Lateral Central Concentrated Load

Spec. No. : 4 Size : 48 x 1.973 x 0.232 inches

Condition of ends : Hinged Rise of curvature : 0.875 inches

Central angle : 0.14666 rads. Radius of curvature : 329.580 inches

No.	Central deflection B_1 in inches	b^*_1	Lateral dead weight P in Pounds	P^*
1	0	0	0	0
2	0.016	0.00225	18.0	0.01270
3	0.032	0.00451	34.0	0.02398
4	0.040	0.00564	42.0	0.02963
5	0.055	0.00775	50.0	0.03527
6	0.063	0.00888	58.0	0.04091
7	0.071	0.01001	66.0	0.04656
8	0.087	0.01227	74.0	0.05220
9	0.094	0.01326	78.0	0.05502
10	0.102	0.01438	81.0	0.05714
11	0.110	0.01551	84.0	0.05925
12	0.125	0.01763	87.0	0.06137
13	0.141	0.01989	89.0	0.06278
14			90.0++	0.06348

Notes: $b^*_1 = \frac{B_1}{R}\beta^2$; $P^* = \frac{PR}{Et^2 f\beta}$

++ - The snap buckling occurs.

Table 2.5

Result of A Bowed Strut Under A Lateral Central Concentrated Load

Spec. No. : 5 Size : 48 x 1.973 x 0.232 inches

Condition of ends : Hinged Rise of curvature : 1.000 inches

Central angle : 0.16761 rads. Radius of curvature : 288.500 inches

No.	Central deflection B_1 in inches	b^*_1	Lateral dead weight P in Pounds	P^*
1	0	0	0	0
2	0.016	0.00197	20.0	0.01081
3	0.032	0.00394	30.0	0.01621
4	0.040	0.00493	40.0	0.02161
5	0.047	0.00579	48.0	0.02593
6	0.063	0.00777	56.0	0.03026
7	0.071	0.00876	64.0	0.03458
8	0.087	0.01073	72.0	0.03890
9	0.102	0.01258	80.0	0.04322
10	0.110	0.01357	85.0	0.04592
11	0.117	0.01443	90.0	0.04863
12	0.133	0.01640	94.0	0.05079
13	0.165	0.02035	96.0	0.05187
14			97.0++	0.05241

Notes: $b^*_1 = \frac{B_1}{R\beta} 2$; $P^* = \frac{PR}{Et^2 f \beta}$

++ - The snap buckling occurs.

Table 2.6

Result of A Bowed Strut Under A Lateral Central Concentrated Load

Spec. No. : 6 Size : 48 x 1.973 x 0.232 inches

Condition of ends : Hinged Rise of curvature : 1.125 inches

Central angle : 0.18682 rads. Radius of curvature : 256.563 inches

No.	Central deflection B_1 in inches	b^*_1	Lateral dead weight P in Pounds	P^*
1	0	0	0	0
2	0.016	0.00178	30.0	0.01293
3	0.032	0.00357	50.0	0.02155
4	0.055	0.00614	70.0	0.03017
5	0.063	0.00703	82.0	0.03535
6	0.087	0.00971	94.0	0.04052
7	0.102	0.01139	104.0	0.04483
8	0.117	0.01306	110.0	0.04742
9	0.133	0.01485	114.0	0.04914
10	0.149	0.01663	116.0	0.05000
11			117.0++	0.05043

Notes: $b^*_1 = \frac{B_1}{R\beta}2$; $P^* = \frac{PR}{Et^2 f\beta}$

++ - The snap buckling occurs.

Table 2.7

Result of A Bowed Strut Under A Lateral Central Concentrated Load

Spec. No. : 7 Size : 48 x 1.973 x 0.231 inches

Condition of ends : Hinged Rise of curvature : 1.250 inches

Central angle : 0.20777 rads. Radius of curvature : 231.025 inches

No.	Central deflection B_1 in inches	b^*_1	Lateral dead weight P in Pounds	P^*
1	0	0	0	0
2	0.016	0.00160	30.0	0.01047
3	0.032	0.00320	50.0	0.01745
4.	0.047	0.00471	65.0	0.02269
5	0.063	0.00631	80.0	0.02792
6	0.087	0.00872	95.0	0.03316
7	0.094	0.00942	103.0	0.03595
8	0.102	0.01022	107.0	0.03735
9	0.110	0.01102	111.0	0.3874
10	0.125	0.01253	115.0	0.04014
11	0.133	0.01333	119.0	0.04153
12	0.141	0.01413	123.0	0.04293
13	0.172	0.01724	126.0	0.04398
14			127.0++	0.04433

Notee: $b^*_1 = \frac{B_1}{R\beta}2$; $P^* = \frac{PR}{Et^2 f \beta}$

++ - The snap buckling occurs.

Table 2.8

Result of A Bowed Strut Under A Lateral Central Concentrated Load

Spec. No. : 8 Size : 48 x 1.973 x 0.232 inches

Condition of ends : Hinged Rise of curvature : 1.375 inches

Central angle : 0.22872 rads. Radius of curvature : 210.142 inches

No.	Central deflection B_1 in inches	b_1^*	Lateral dead weight P in Pounds	P^*
1	0	0	0	0
2	0.024	0.00218	40.0	0.01154
3	0.055	0.00500	80.0	0.02307
4	0.071	0.00645	100.0	0.02884
5	0.079	0.00718	110.0	0.03172
6	0.094	0.00855	120.0	0.03461
7	0.110	0.01000	130.0	0.03749
8	0.118	0.01073	136.0	0.03922
9	0.125	0.01137	140.0	0.04037
10	0.133	0.01209	142.0	0.04037
11	0.149	0.01355	144.0	0.04153
12	0.157	0.01428	145.0	0.04182
13			146.0++	0.04210

Notes: $b_1^* = \frac{B_1}{R\beta}2$; $P^* = \frac{PR}{Et^2 f\beta}$

++ - The snap buckling occurs.

Table 2.9

Result of A Bowed Strut Under A Lateral Central Concentrated Load

Spec. No. : 9 Size : 48 x 1.973 x 0.232 inches

Condition of ends : Hinged Rise of curvature : 1.500 inches

Central angle : 0.24967 rads. Radius of curvature : 192.750 inches

No.	Central deflection B_1 in inches	b_1^*	Lateral dead weight P in Pounds	P^*
1	0	0	0	0
2	0.024	0.00199	40.0	0.00969
3	0.055	0.00457	80.0	0.01939
4	0.071	0.00590	95.0	0.02302
5	0.087	0.00724	110.0	0.02666
6	0.102	0.00848	125.0	0.03029
7	0.118	0.00982	135.0	0.03271
8	0.135	0.01123	143.0	0.03465
9	0.157	0.01306	151.0	0.03659
10	0.188	0.01564	155.0	0.03756
11			157.0++	0.03804

Notes: $b_1^* = \frac{B_1}{R\beta}2$; $P^* = \frac{PR}{Et^2 f\beta}$

++ - The snap buckling occurs.

Table 2.10

Result of A Bowed Strut Under A Lateral Central Concentrated Load

Spec. No. : 10 Size : 48 x 1.973 x 0.233 inches

Condition of ends : Clamped Rise of curvature : 0.500 inches

Central angle : 0.08380 rads. Radius of curvature : 576.250 inches

No.	Central deflection B_1 in inches	b_1^*	Lateral dead weight P in Pounds	P^*
1	0	0	0	0
2	0.016	0.00395	12.5	0.02698
3	0.039	0.00963	24.5	0.05288
4	0.055	0.01359	30.5	0.06583
5	0.078	0.01927	36.5	0.07878
6	0.094	0.02322	40.5	0.08742
7	0.125	0.03088	44.5	0.09605
8	0.141	0.03484	46.5	0.10037
9	0.172	0.04250	48.5	0.10468
10	0.203	0.05016	50.0	0.10792
11	0.235	0.05807	51.0	0.11008
12			51.5**	0.11116

Notes: $b_1^* = \frac{B_1}{R\beta}2$; $P^* = \frac{PR}{Et^2 f\beta}$

++ - The snap buckling occurs.

Table 2.11

Result of A Bowed Strut Under A Lateral Central Concentrated Load

Spec. No. : 11 Size : 48 x 1.973 x 0.232 inches

Condition of ends : Clamped Rise of curvature : 0.625 inches

Central angle : 0.10476 rads. Radius of curvature : 461.113 inches

No.	Central deflection B_1 in inches	b_1^*	Lateral dead weight P in Pounds	P^*
1	0	0	0	0
2	0.008	0.00158	20.0	0.02763
3	0.023	0.00454	34.0	0.04697
4	0.039	0.00770	45.0	0.06217
5	0.054	0.01067	52.0	0.07184
6	0.070	0.01383	59.0	0.08151
7	0.086	0.01699	65.0	0.08980
8	0.101	0.01995	70.0	0.09671
9	0.117	0.02312	75.0	0.10362
10	0.148	0.02924	80.0	0.11053
11	0.164	0.03240	84.0	0.11606
12	0.179	0.03537	87.0	0.12020
13	0.211	0.04169	90.0	0.12434
14			92.0++	0.12711

Notes: $b_1^* = \frac{B_1}{R\beta}^2$; $P^* = \frac{PR}{Et^2 f \beta}$

++ - The snap buckling occurs.

Table 2.12

Result of A Bowed Strut Under A Lateral Central Concentrated Load

Spec. No. : 12 Size : 48 x 1.973 x 0.232 inches

Condition of ends : Clamped Rise of curvature : 0.750 inches

Central angle : 0.12571 rads. Radius of curvature : 384.375 inches

No.	Central deflection B_1 in inches	b_1^*	Lateral dead weight P in Pounds	P^*
1	0	0	0	0
2	0.008	0.00131	20.0	0.01920
3	0.024	0.00395	40.0	0.03839
4	0.039	0.00642	56.0	0.05375
5	0.047	0.00773	66.0	0.06334
6	0.063	0.01037	76.0	0.07294
7	0.078	0.01284	86.0	0.08254
8	0.094	0.01547	96.0	0.09214
9	0.110	0.01810	106.0	0.10173
10	0.125	0.02057	114.0	0.10941
11	0.141	0.02321	122.0	0.11709
12	0.164	0.02699	130.0	0.12477
13	0.180	0.02963	136.0	0.13053
14	0.211	0.03473	142.0	0.13628
15	0.227	0.03737	146.0	0.14012

Notes: $b_1^* = \frac{B_1}{R\beta}2$; $P^* = \frac{PR}{Et^2 f\beta}$

++ - The snap buckling occurs.

Table 2.12

Result of A Bowed Strut Under A Lateral Central Concentrated Load

Spec. No. : 12 Size : 48 x 1.973 x 0.232 inches

Condition of ends : Clamped Rise of curvature : 0.750 inches

Central angle : 0.12571 rads. Radius of curvature : 384.375 inches

No.	Central deflection B_1 in inches	b_1^*	Lateral dead weight P in Pounds	P^*
16	0.250	0.04115	148.0	0.14204
17			149.0++	0.14300

Notes: $b_1^* = \frac{B_1}{R\beta}2$; $P^* = \frac{PR}{Et^2 f\beta}$

++ - The snap buckling occurs.

Table 2.13

Result of A Bowed Strut Under A Lateral Central Concentrated Load

Spec. No. : 13 Size : 48 x 1.973 x 0.232 inches

Condition of ends : Clamped Rise of curvature : 0.875 inches

Central angle : 0.14666 rads. Radius of curvature : 329.580 inches

No.	Central deflection B_1 in inches	b_1^*	Lateral dead weight P in Pounds	P^*
1	0	0	0	0
2	0.016	0.00225	40.0	0.02822
3	0.031	0.00437	70.0	0.04938
4	0.055	0.00775	100.0	0.07054
5	0.070	0.00987	124.0	0.08747
6	0.094	0.01326	144.0	0.10157
7	0.109	0.01537	156.0	0.11004
8	0.125	0.01763	168.0	0.11850
9	0.141	0.01989	180.0	0.12697
10	0.164	0.02313	192.0	0.13543
11	0.180	0.02539	200.0	0.14108
12	0.195	0.02750	206.0	0.14531
13	0.226	0.03188	212.0	0.14954
14	0.258	0.03639	216.0	0.15236
15	0.273	0.03851	219.0	0.15448

Notes: $b_1^* = \frac{B_1}{R\beta}2$; $P^* = \frac{PR}{Et^2 f\beta}$

++ → The snap buckling occurs.

Table 2.13

Result of A Bowed Strut Under A Lateral Central Concentrated Load

Spec. No. : 13 Size : 48 x 1.973 x 0.232 inches

Condition of ends : Clamped Rise of curvature : 0.875 inches

Central angle : 0.14666 rads. Radius of curvature : 329.580 inches

No.	Central deflection B_1 in inches	b^*_1	Lateral dead weight P in Pounds	P^*
16	0.297	0.04189	220.0	0.15518
			221.0++	0.15589

Notes: $b^*_1 = \frac{B_1}{R\beta}2$; $P^* = \frac{PR}{Et^2 f\beta}$

++ - The snap buckling occurs.

Table 2.14

Result of A Bowed Strut Under A Lateral Central Concentrated Load

Spec. No. : 14 Size : 48 x 1.973 x 0.232 inches

Condition of ends : Clamped Rise of curvature : 1.000 inches

Central angle : 0.16761 rads. Radius of curvature : 288.500 inches

No.	Central deflection B_1 in inches	b^*_1	Lateral dead weight P in Pounds	P^*
1	0	0	0	0
2	0.016	0.00197	70.0	0.03782
3	0.024	0.00296	100.0	0.05403
4	0.039	0.00481	130.0	0.07024
5	0.055	0.00678	160.0	0.08644
6	0.078	0.00962	184.0	0.09941
7	0.094	0.01159	204.0	0.11022
8	0.125	0.01542	224.0	0.12102
9	0.149	0.01838	244.0	0.13183
10	0.164	0.02023	252.0	0.13615
11	0.180	0.02220	260.0	0.14047
12	0.203	0.02504	266.0	0.14371
13	0.235	0.02899	270.0	0.14588
14	0.274	0.03380	273.0	0.14750
15	0.289	0.03565	275.0	0.14858

Notes: $b^*_1 = \frac{B_1}{R\beta}2$; $P^* = \frac{PR}{Et^2 f\beta}$

++ - The snap buckling occurs.

Table 2.14

Result of A Bowed Strut Under A Lateral Central Concentrated Load

Spec. No. : 14 Size : 48 x 1.973 x 0.231 inches

Condition of ends : Clamped Rise of curvature : 1.000 inches

Central angle : 0.16761 rads. Radius of curvature : 288.500 inches

No.	Central deflection B_1 in inches	b^*_1	Lateral dead weight P in Pounds	P^*
16			276.0++	0.14912

Notes: $b^*_1 = \frac{B_1}{R\beta}2$; $P^* = \frac{PR}{Et^2 f \beta}$

++ - The snap buckling occurs.

Table 2.15

Result of A Bowed Strut Under A Lateral Central Concentrated Load

Spec. No. : 15 Size : 48 x 1.973 x 0.232 inches

Condition of ends : Clamped Rise of curvature : 1.125 inches

Central angle : 0.18682 rads. Radius of curvature : 256.563 inches

No.	Central deflection B_1 in inches	b^*_1	Lateral dead weight P in Pounds	P^*
1	0	0	0	0
2	0.024	0.00268	100.0	0.04311
3	0.047	0.00524	150.0	0.06466
4	0.063	0.00703	175.0	0.07544
5	0.078	0.00871	195.0	0.08406
6	0.094	0.01049	215.0	0.09268
7	0.117	0.01306	235.0	0.10130
8	0.141	0.01574	250.0	0.10777
9	0.156	0.01742	260.0	0.11208
10	0.172	0.01920	270.0	0.11639
11	0.188	0.02099	280.0	0.12070
12	0.203	0.02267	288.0	0.12415
13	0.235	0.02624	296.0	0.12759
14	0.266	0.02970	304.0	0.13104
15	0.313	0.03495	312.0	0.13449

Notes: $b^*_1 = \frac{B_1}{R\beta}2$; $P^* = \frac{PR}{Et^2 f\beta}$

++ - The snap buckling occurs.

Table 2.15

Result of A Bowed Strut Under A Lateral Central Concentrated Load

Spec. No. : 15 Size : 48 x 1.973 x 0.232 inches

Condition of ends : Clamped Rise of curvature : 1.125 inches

Central angle : 0.18682 rads. Radius of curvature : 256.563 inches

No.	Central deflection B_1 in inches	b^*_1	Lateral dead weight P in Pounds	P^*
16	0.375	0.04187	316.0	0.13621
17			318.0++	0.13708

Notes: $b^*_1 = \frac{B_1}{R\beta}^2$; $P^* = \frac{PR}{Et^2 f\beta}$

++ - The snap buckling occurs.

Table 2.16

Result of A Bowed Strut Under A Lateral Central Concentrated Load

Spec. No. : 16 Size : 48 x 1.973 x 0.232 inches

Condition of ends : Clamped Rise of curvature : 1.250 inches

Central angle : 0.20777 rads. Radius of curvature : 231.025 inches

No.	Central deflection B_1 in inches	b_1^*	Lateral dead weight P in Pounds	P^*
1	0	0	0	0
2	0.024	0.00240	100.0	0.03490
3	0.055	0.00551	175.0	0.06108
4	0.078	0.00782	220.0	0.07678
5	0.110	0.01102	265.0	0.09249
6	0.149	0.01494	310.0	0.10820
7	0.180	0.01804	335.0	0.11692
8	0.219	0.02195	360.0	0.12565
9	0.281	0.02817	370.0	0.12914
10	0.313	0.03138	375.0	0.13088
11			377.0++	0.13158

Notes: $b_1^* = \frac{B_1}{R\beta}^2$; $P^* = \frac{PR}{Et^2 f \beta}$

++ - The snap buckling occurs.

Table 2.17

Result of A Bowed Strut Under A Lateral Central Concentrated Load

Spec. No. : 17 Size : 48 x 1.973 x 0.232 inches

Condition of ends : Clamped Rise of curvature : 1.375 inches

Central angle : 0.22872 rads. Radius of curvature : 210.142 inches

No.	Central deflection B_1 in inches	b_1^*	Lateral dead weight P in Pounds	P^*
1	0	0	0	0
2	0.024	0.00218	100.0	0.02884
3	0.047	0.00427	165.0	0.04758
4	0.086	0.00782	225.0	0.06489
5	0.110	0.01000	265.0	0.07642
6	0.149	0.01355	300.0	0.08652
7	0.172	0.01564	325.0	0.09373
8	0.195	0.01773	345.0	0.09949
9	0.235	0.02137	365.0	0.10526
10	0.282	0.02565	385.0	0.11103
11	0.344	0.03129	400.0	0.11536
12	0.391	0.03556	415.0	0.11968
13	0.453	0.04120	420.0	0.12112
14			422.0++	0.12170

Notes: $b_1^* = \frac{B_1}{R\beta} z$; $P^* = \frac{PR}{Et^2 f \beta}$

++ - The snap buckling occurs.

Table 2.18

Result of A Bowed Strut Under A Lateral Central Concentrated Load

Spec. No. : 18 Size : 48 x 1.973 x 0.232 inches

Condition of ends : Clamped Rise of curvature : 1.500 inches

Central angle : 0.24967 rads. Radius of curvature : 192.750 inches

No.	Central deflection B_1 in inches	b_1^*	Lateral dead weight P in Pounds	P^*
1	0	0	0	0
2	0.016	0.00133	80.0	0.01939
3	0.047	0.00391	160.0	0.03877
4	0.070	0.00582	220.0	0.05331
5	0.094	0.00782	265.0	0.06421
6	0.125	0.01040	315.0	0.07633
7	0.172	0.01431	360.0	0.08724
8	0.227	0.01889	405.0	0.09814
9	0.274	0.02280	435.0	0.10541
10	0.297	0.02471	445.0	0.10783
11	0.329	0.02738	455.0	0.11026
12	0.375	0.03121	461.0	0.11171
13			463.0++	0.11219

Notes: $b_1^* = \frac{B_1}{R\beta^2}$; $P^* = \frac{PR}{Et^2 f \beta}$

++ - The snap buckling occurs.

Table 3

Experimental Results in Non-dimensional Form

Geometry and Critical Load of Bowed Struts

Geometry λ^*	Critical Load $P^*_{expt.}$	
	Hinged Ends	Clamped Ends
17.51199	0.09497	0.11116
21.89783	0.08497	0.12711
26.29056	0.07102	0.14300
30.67519	0.06348	0.15589
35.08207	0.05241	0.14912
38.76203	0.05043	0.13708
43.16463	0.04433	0.13158
47.58670	0.04210	0.12170
52.00909	0.03804	0.11219

Note: Effective size of specimens :

L = 48 in.; f = 1.973 in.; t = 0.232 in.

Table 4

Comparison of Theoretical Values with Experimantal Results

The Critical Load of Bowed Struts

Rise h. in inches	Critical Load P. in Pounds				
	Hinged Ends			Clamped Ends	
	Classical	Energy	Expt.	Energy	Expt.
0.500	35.3	47.9	44.0	56.1	51.5
0.625	46.3	63.5	61.5	95.6	92.0
0.750	56.9	78.3	74.0	152.4	149.0
0.875	67.3	92.8	90.0	222.4	221.0
1.000	77.6	107.1	97.0	280.0	276.0
1.125	87.8	122.2	117.0	333.5	318.0
1.250	98.0	136.2	127.0	384.0	377.0
1.375	108.1	150.1	146.0	432.6	422.0
1.500	118.2	163.9	157.0	479.9	463.0

Note: Effective size of specimens:

L = 48 in.; f = 1.973 in.; t = 0.232 in.

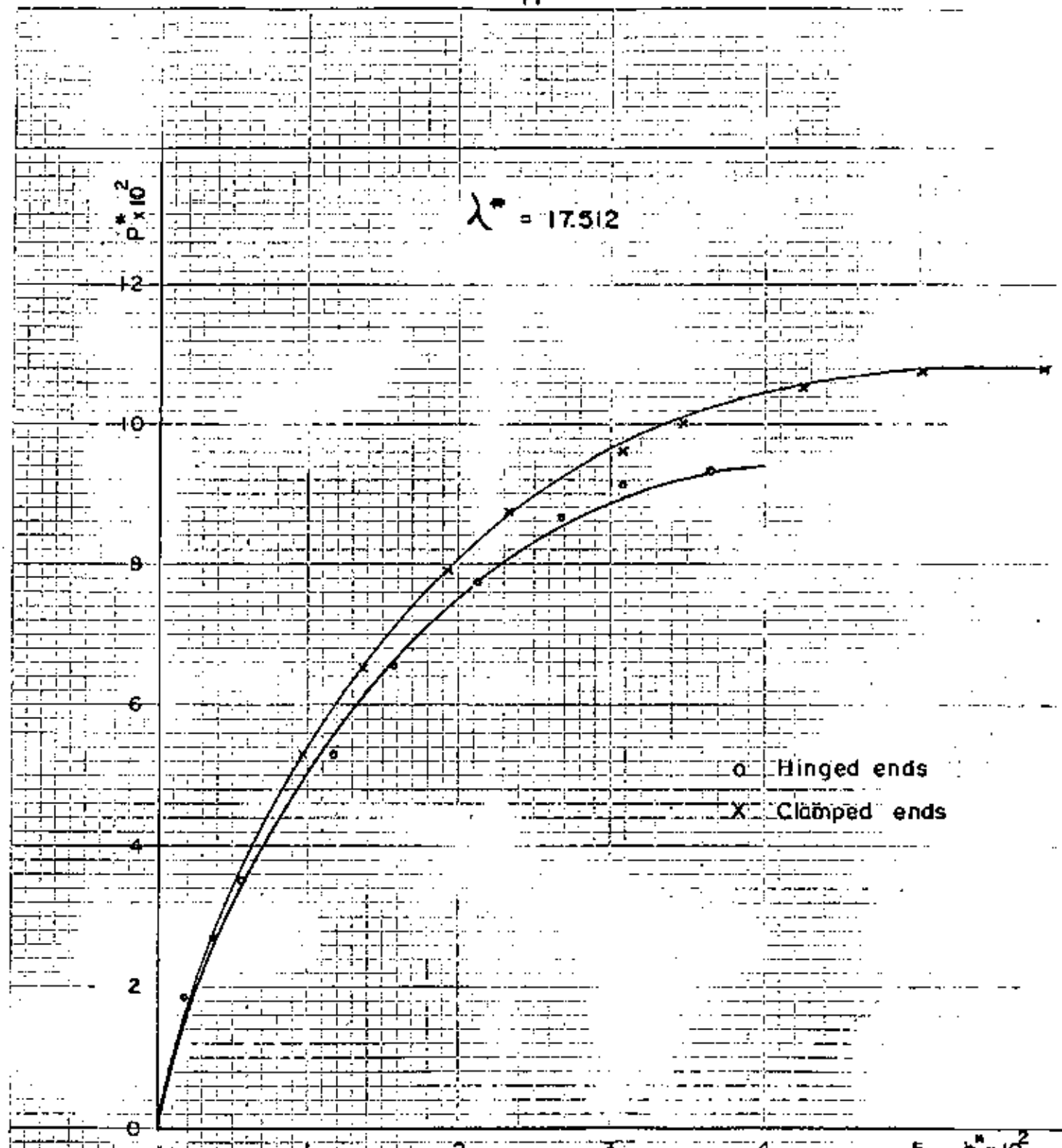

Figure 10.1 Load-deflection curve of bowed struts

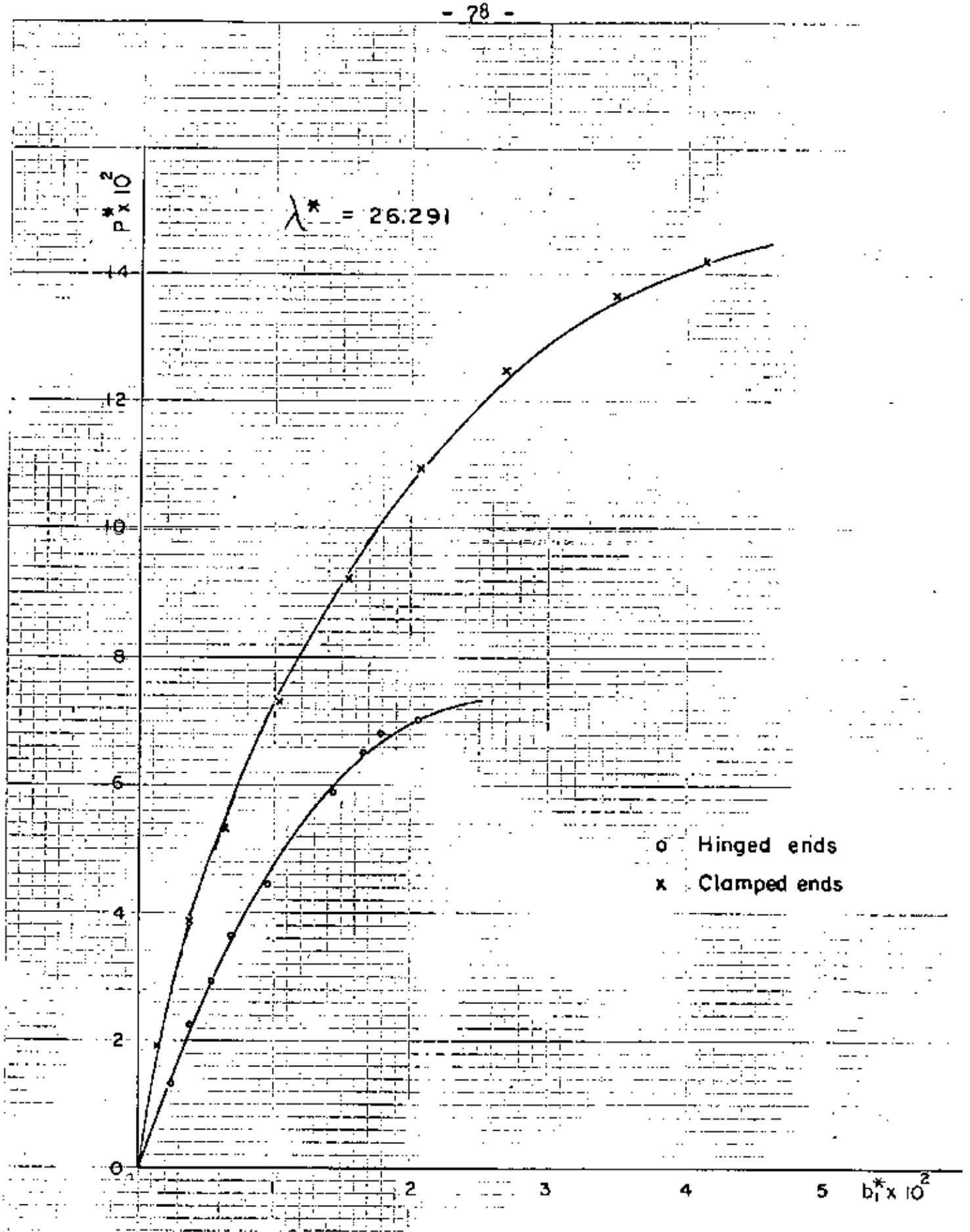

Figure 10.2 Load-deflection curve of bowed struts

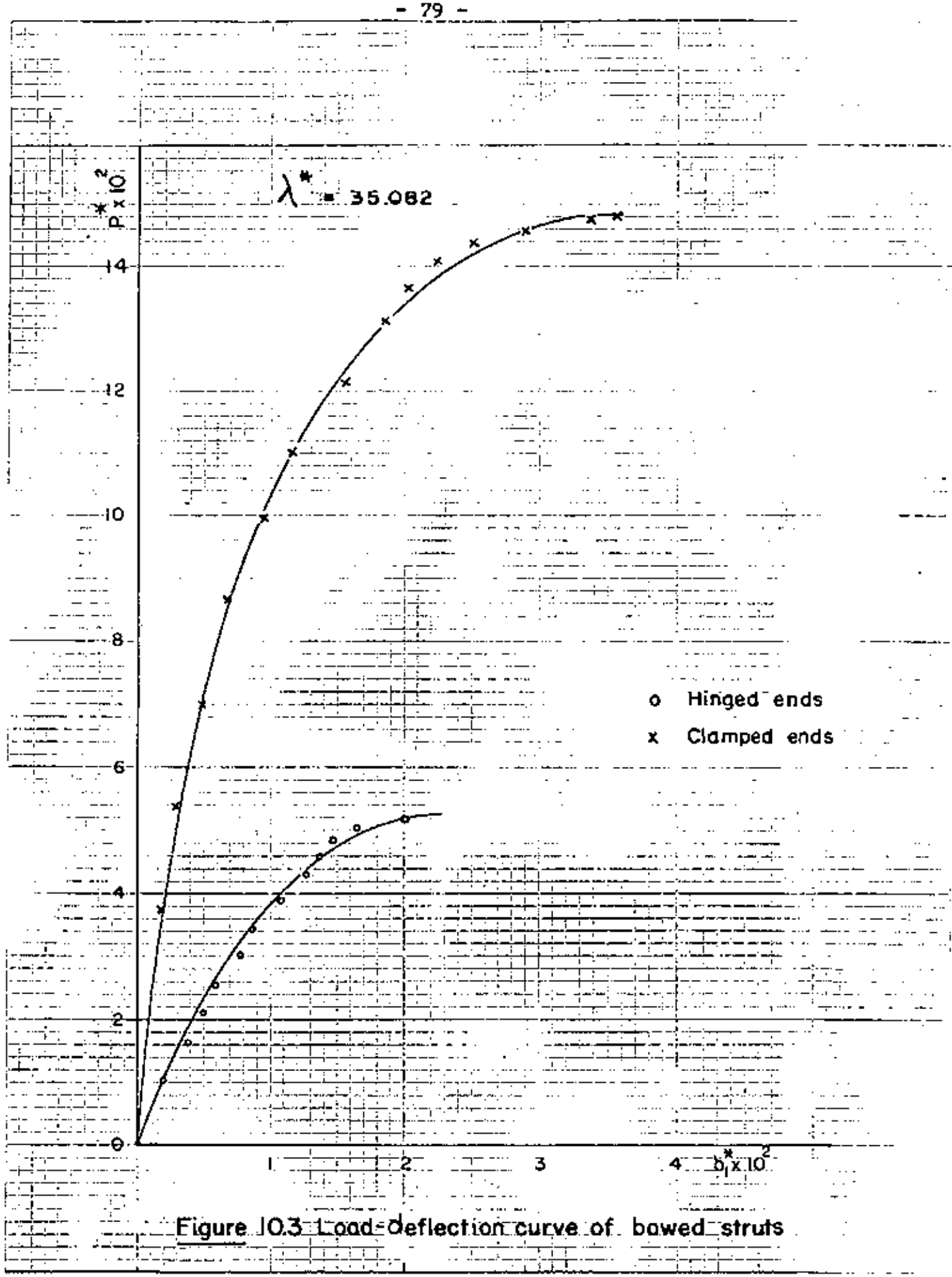

Figure 10.3 Load-deflection curve of bowed struts

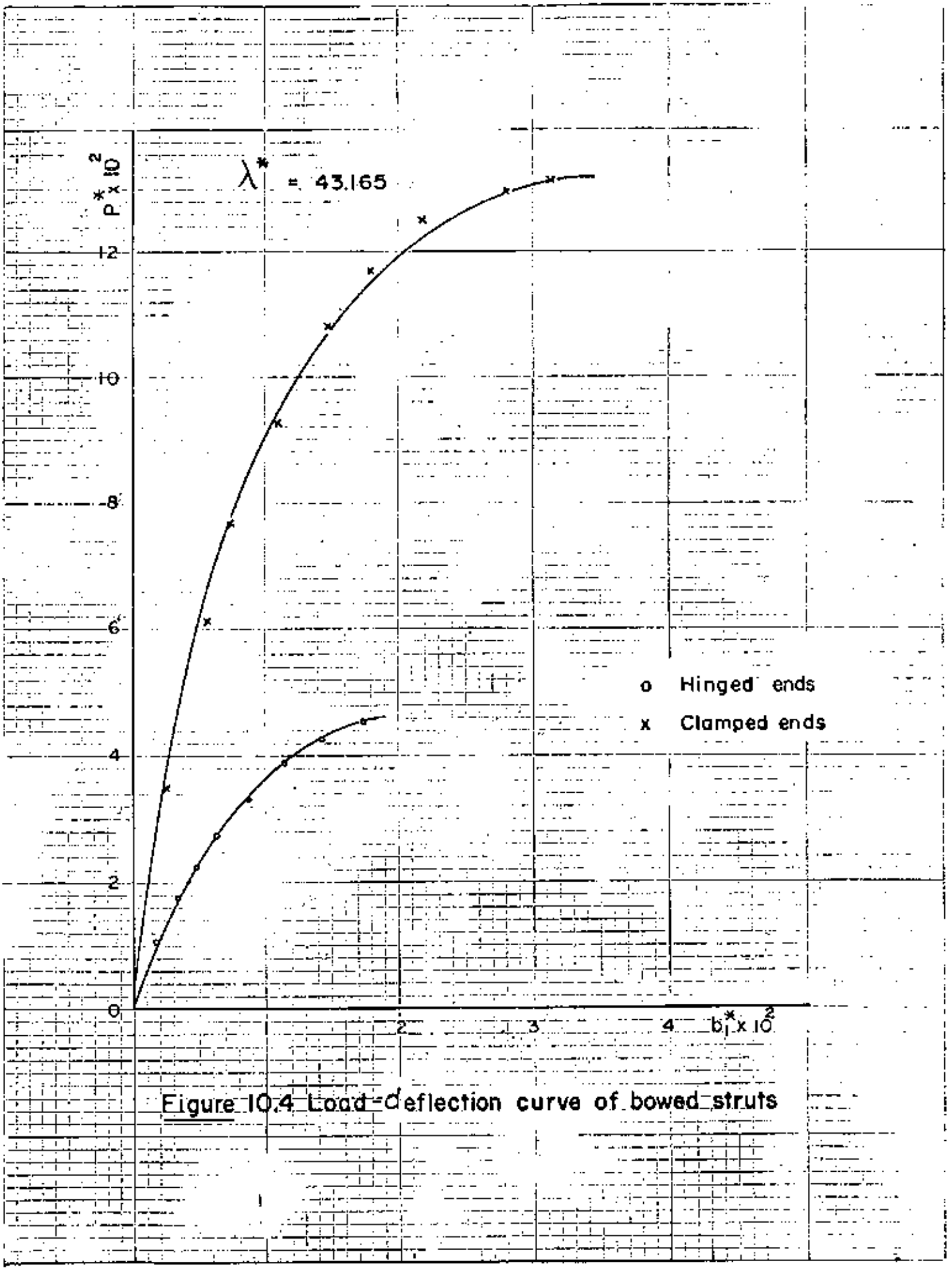

Figure 10.4 Load-deflection curve of bowed struts

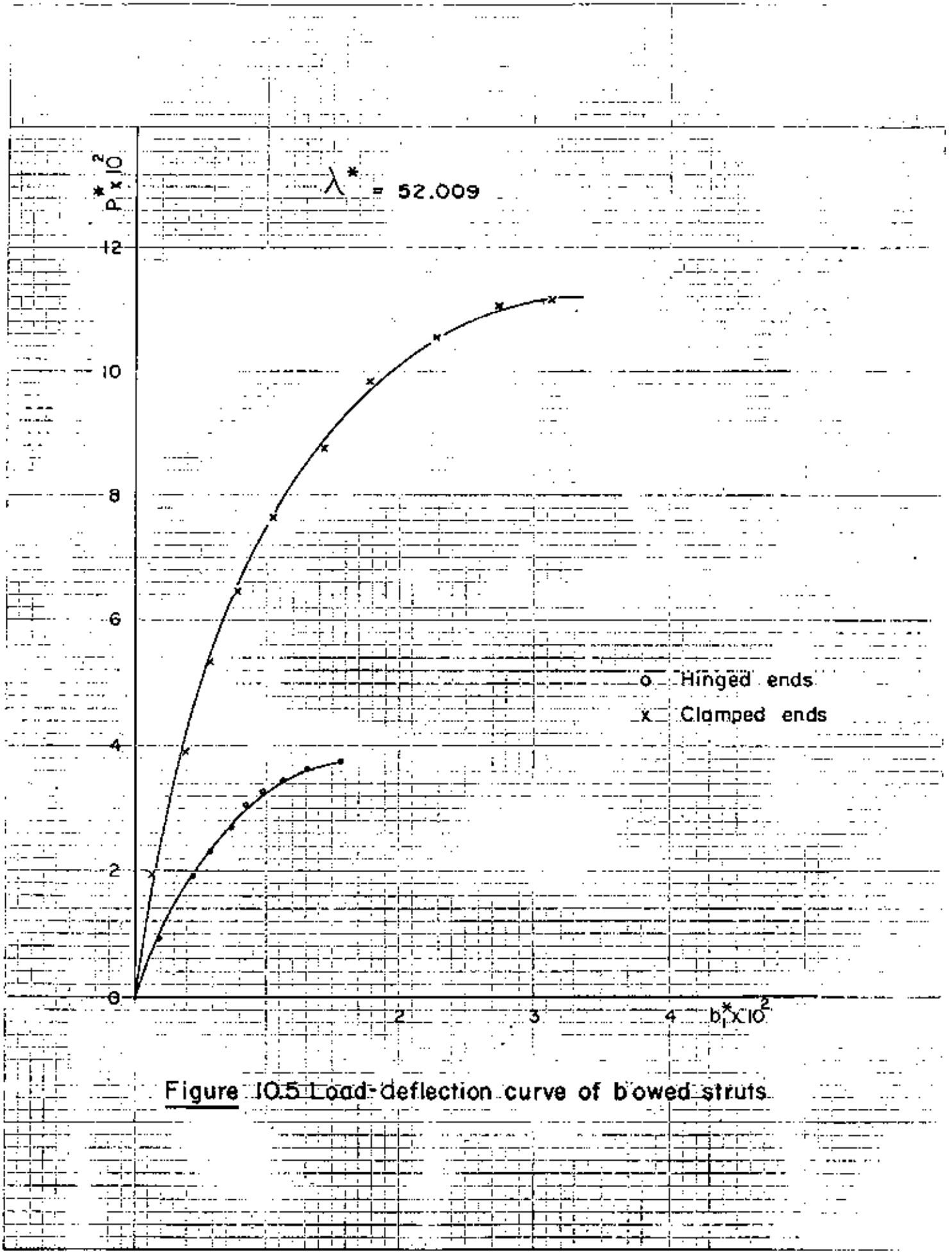

Figure 10.5 Load-deflection curve of bowed struts

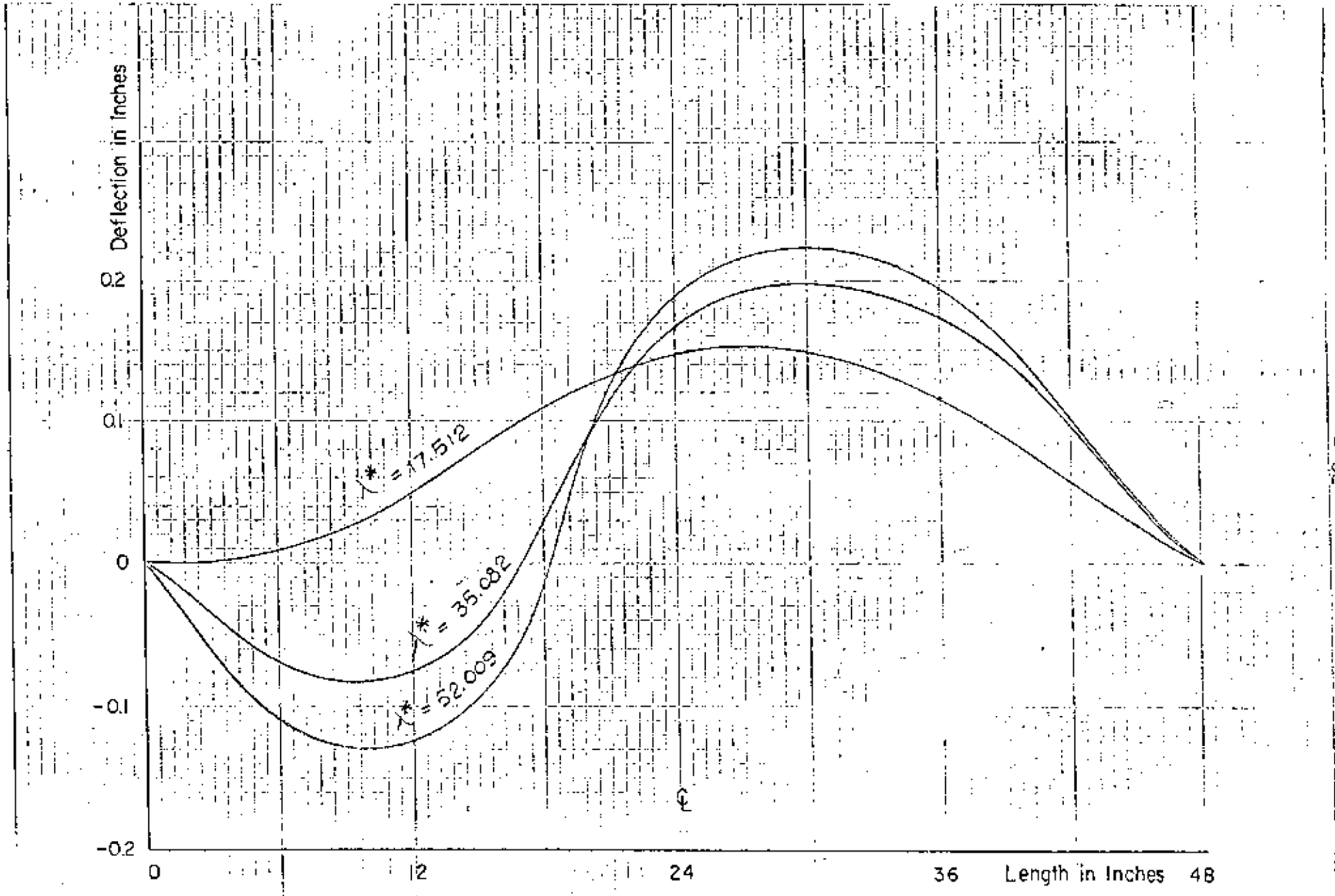

Figure 11 Deflection shape of hinged bowed struts before snap bucking

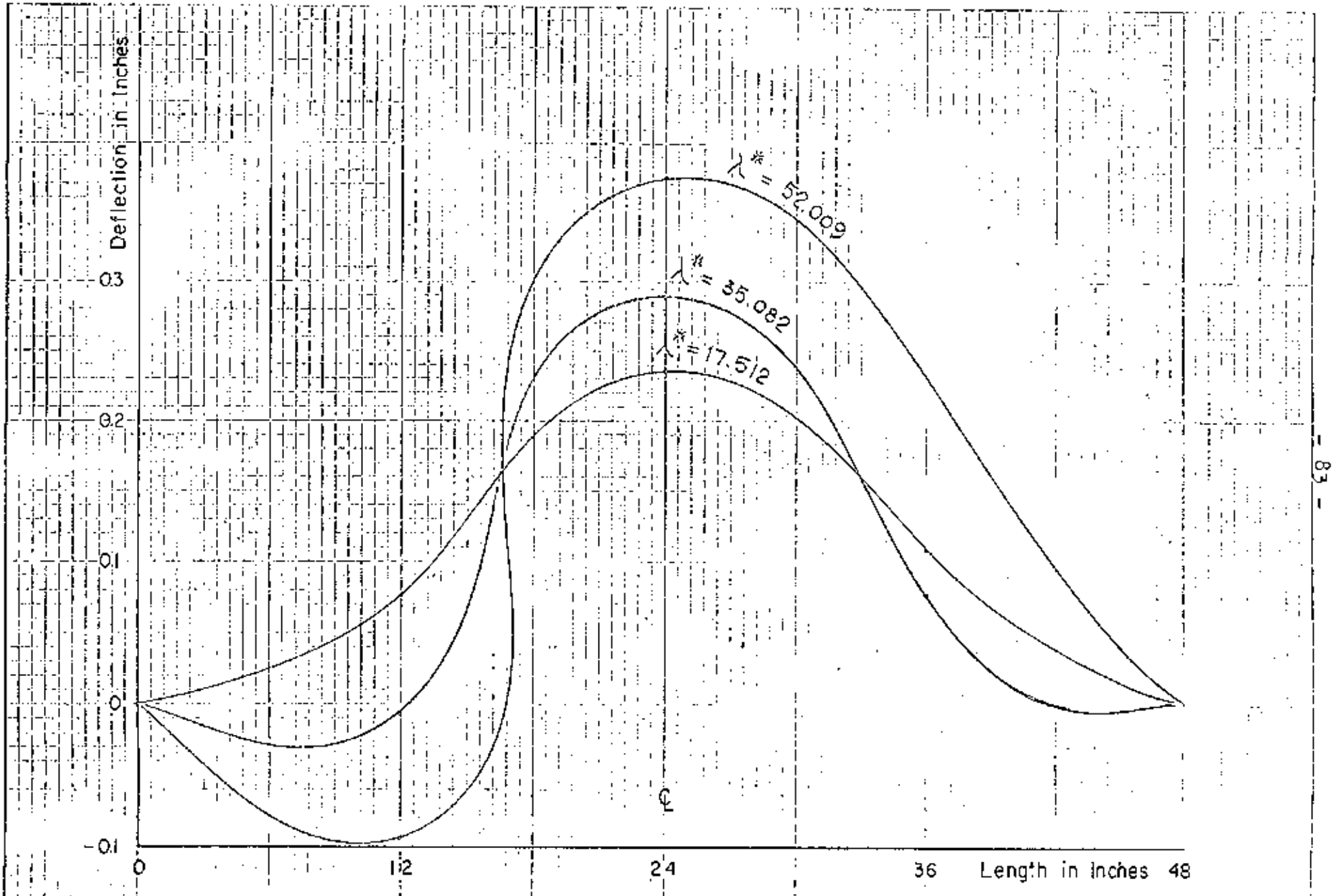

Figure 12 Deflection shape of clamped bowed struts before snap bucking

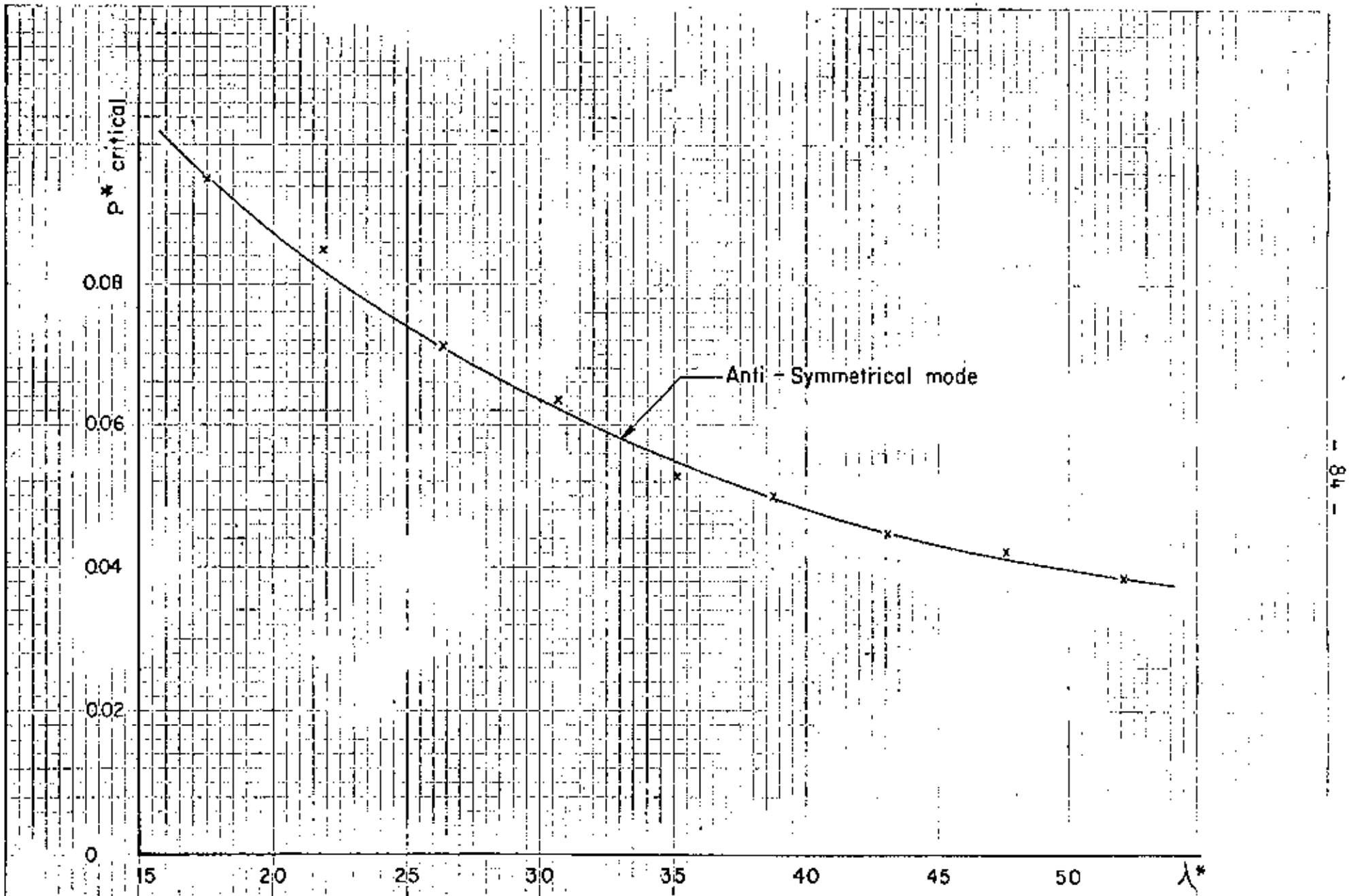

Figure 13 Experimental snap bucking load of hinged bowed struts.

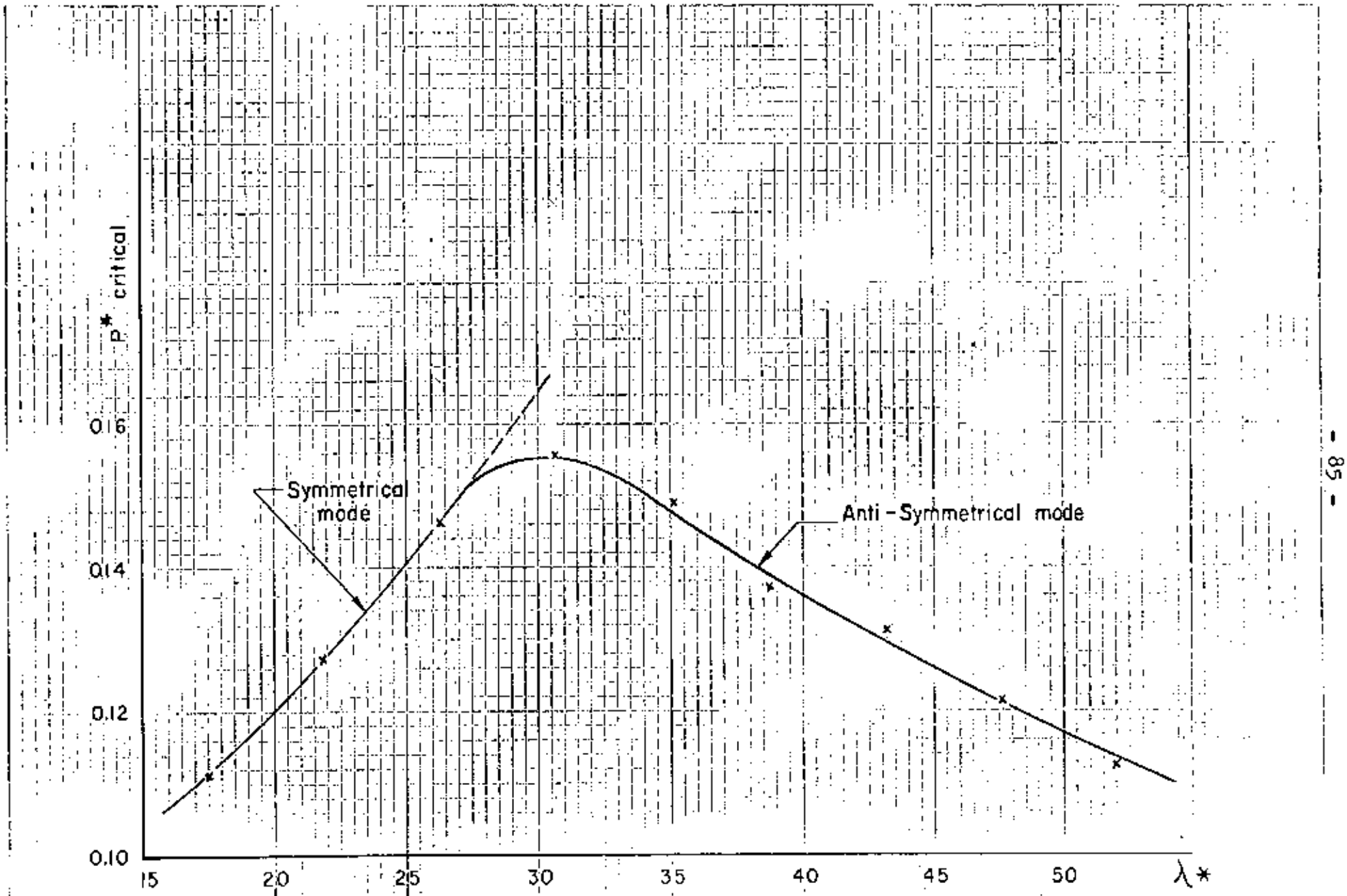

Figure 14 Experimental snap bucking load of clamped bowed struts

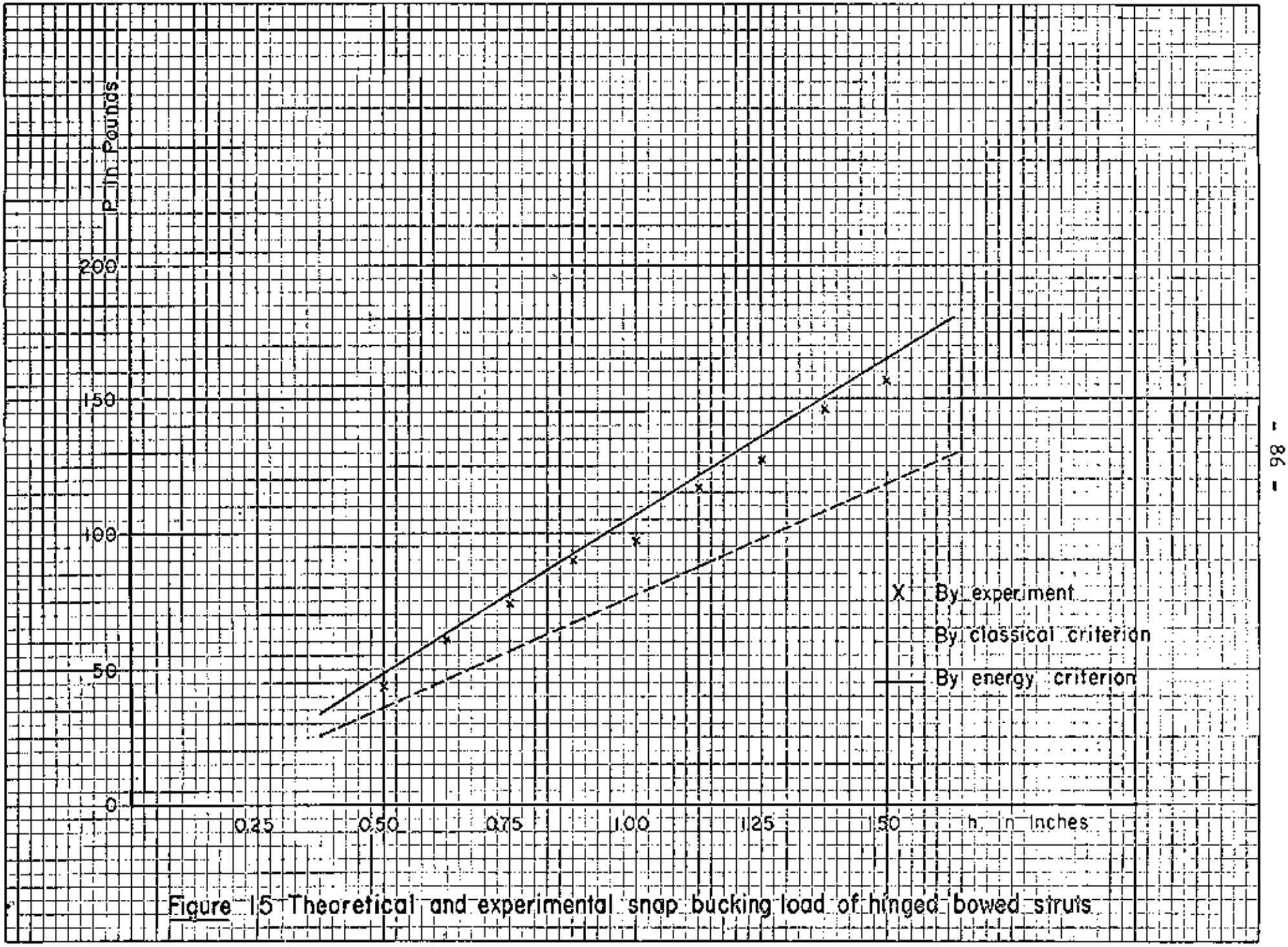

Figure 15 Theoretical and experimental snap bucking load of hinged bowed struts

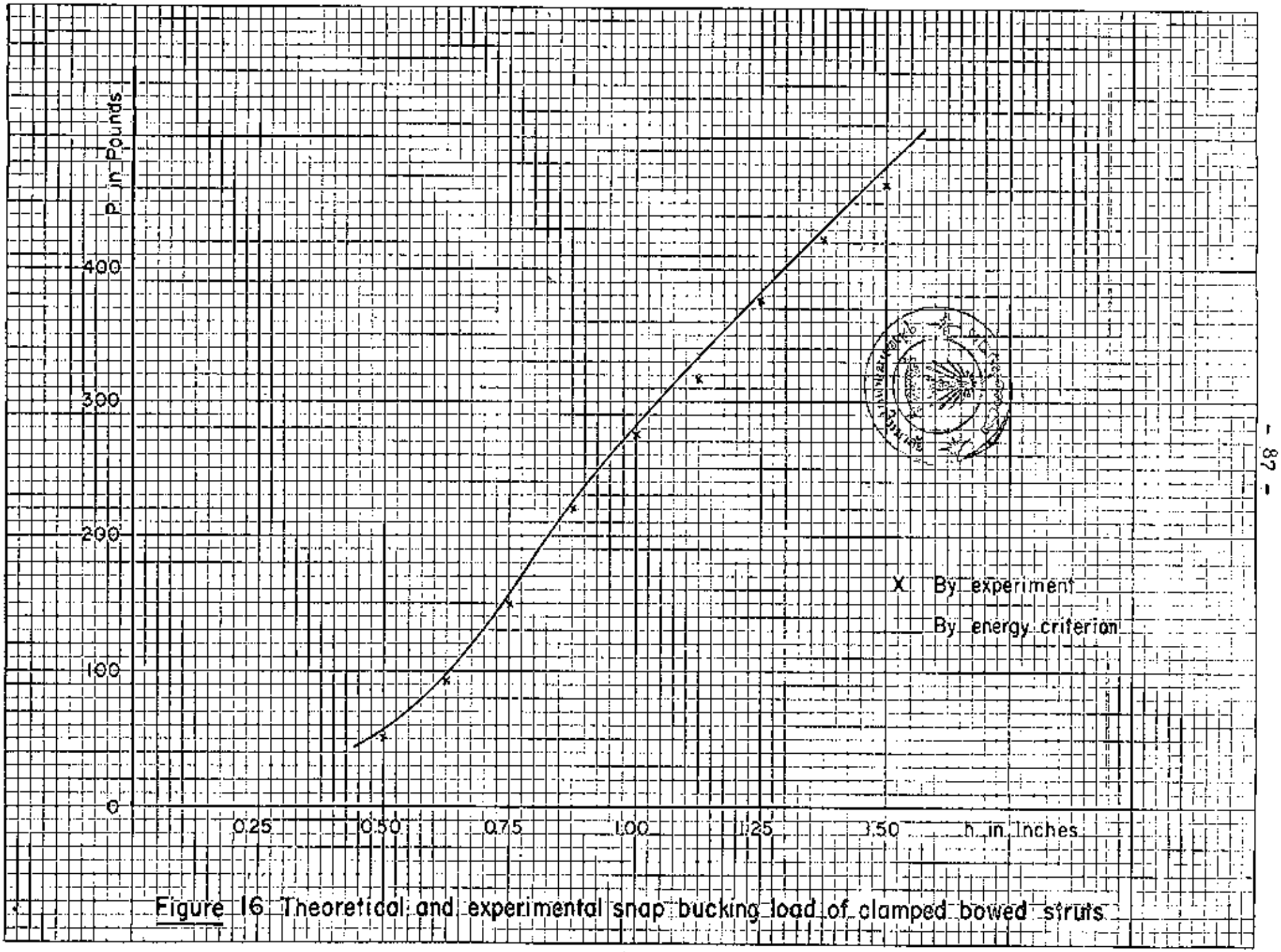

Figure 16 Theoretical and experimental snap bucking load of clamped bowed struts